

# AGvance

Research and innovation for the agri-food industry

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## Wet and Dry Issue Inside

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Canada

## Science: no drought about it

Extra-dry is great for champagne or martinis. But unless you're a cactus farmer, it can be pretty brutal for agriculture. That's why scientists at Agriculture and Agri-Food Canada's labs across the country are working on projects aimed at mitigating the effects of drought.

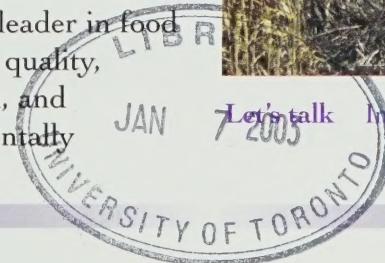
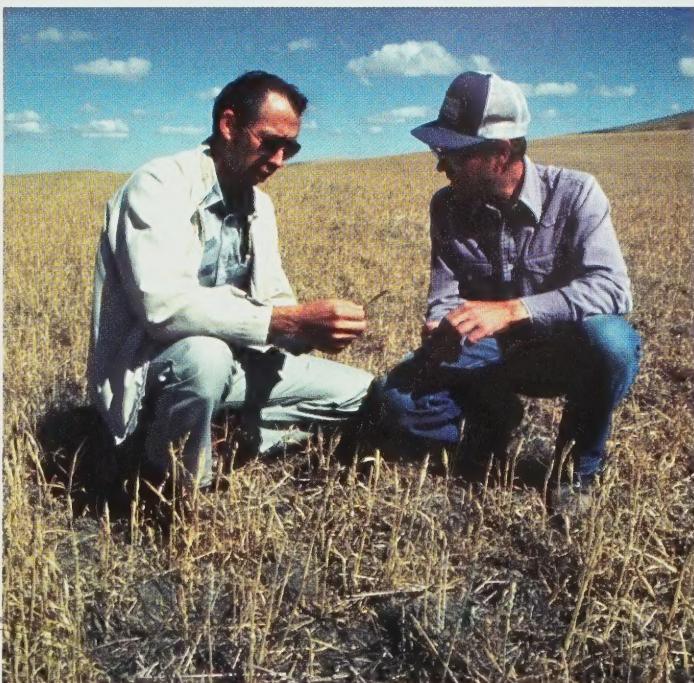
It's a task that takes several tracks. There's the predictable breeding crops for drought tolerance, of course. But a lot of the effort is directed towards water conservation and effective use, too. Precision agriculture can play a role, as can erosion control, automated irrigation systems and fundamental agronomic management technologies.

If Canada is to become the world leader in food safety and quality, innovation, and environmentally

responsible production to meet the needs of consumers at home and abroad, then consistency is key. Sure, the weather's a fickle friend, but when it blows cold, the sector needs the tools to thrive in a highly variable environment.

It's not that science can change weatherborne

destiny overnight. Mark Twain was not entirely correct when he said that everyone talks about the weather, but no one does anything about it. Whether it's too little water, or too much, or whatever adversarial curve nature can throw, AAFC scientists are on the case. 



Improvement is possible through sound science

## Water harvest idea is not all wet

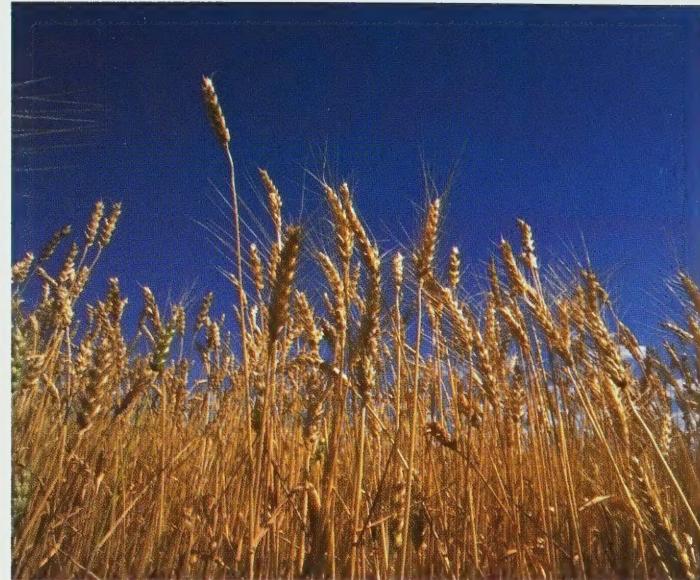
Sometimes the water comes from above, and sometimes it comes from below. Scientists at the Semiarid Prairie Agricultural Research Centre (SPARC) in Swift Current, Saskatchewan, have found that taking groundwater from wet areas has all kinds of benefits.

There are places on the Prairies known as seeps,

where groundwater collects. This makes the soil unsuitable for cultivation, and can lead to soil salinity.

Scientists at SPARC have found a way to extract shallow groundwater and lower water tables from these areas by using gravity and solar-powered pumps.

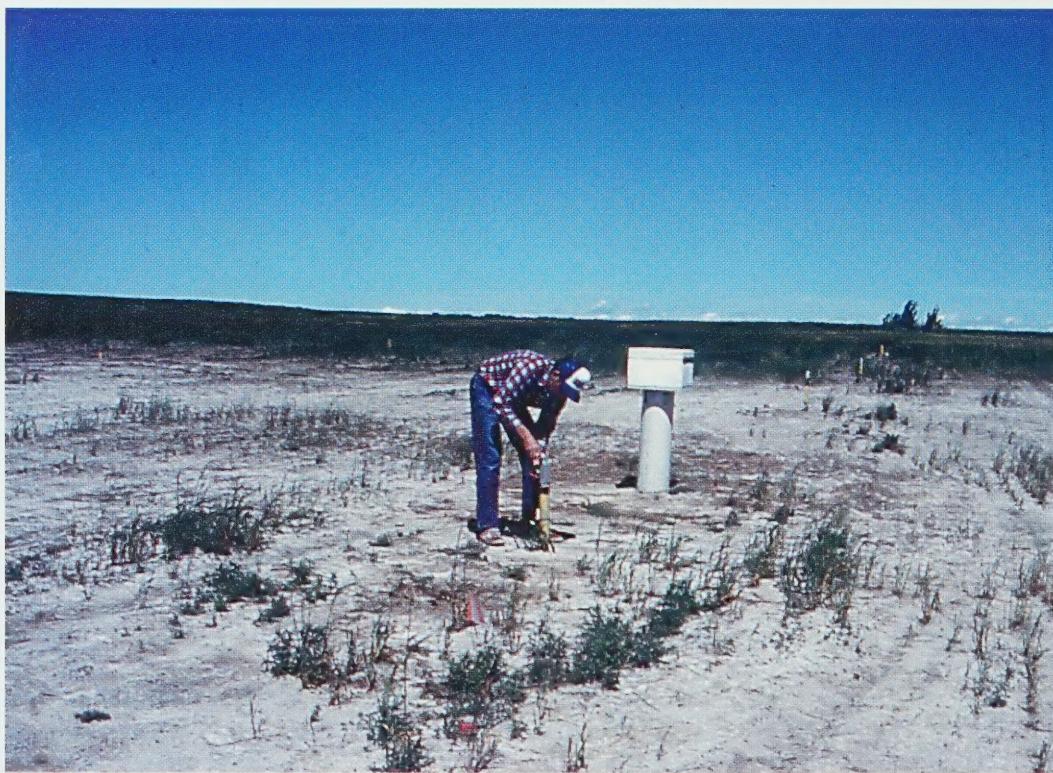
They then tested this idea by de-watering an



area and using the saline soil for growing Harrington barley. Although that land had

never been used for crop growth before, the barley responded with healthy growth and good yields.

So the land can be re-habbed, but there's no sense wasting that water. In this case, the researchers used the harvested water to irrigate woody-crop seedlings in a new shelterbelt. 



**The Robin Hood approach** to water redistribution

For further information, contact Mr. Paul Milburn, Acting Science Director, Water Quality and Quantity

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## Workshop aims to help agri-food sector tap Internet for science

The Canadian Agri-Food Research Council (CARC) is holding a workshop this fall to come up with strategies to help Canada's agri-food sector access scientific knowledge through the Internet.

World competition in agri-food markets is heating up and

consumers are clamouring for safe food produced in an environmentally sound manner. The sector can use scientific knowledge to respond to these challenges.

The Internet is an ideal tool to deliver scientific knowledge. The workshop will help

define the range of knowledge the sector needs, and examine the on-line potential for science knowledge transfer. It will also identify gaps and look into more effective coordination of transfer.

The workshop is aimed at participants from agri-food associations, academia and governments, including policy and research managers, technology transfer specialists, communications and awareness specialists, and web developers.

The workshop will be held in Winnipeg on October 25 - 26. Further information can be obtained directly from CARC or their web site at [www.carc-crac.ca/english](http://www.carc-crac.ca/english)

To contact CARC:

The Canadian Agri-Food Research Council  
Building 60, Central Experimental Farm  
Ottawa, Ontario  
K1A 0C6

Tel: (613) 234-2325  
Fax: (613) 234-2330

## Make your own instant data base with new software package

Horticulturalists can now create an instant data base for any type of crop, insect, pest, weed, or what have you, thanks to UniBase.

UniBase is a user-friendly software package derived in part from the Pedigree package of 1997. It allows the user to create one or multiple data bases by importing

existing data and images.

Images and pedigrees of any horticultural crop can be viewed instantly, and there's no limit to the number of entries or images that can be stored.

The CD includes basic information on several horticultural fruit crops such as blueberries, apples, strawberries and



**Who's your daddy** Keep track with UniBase

cherries, and  
ornamentals including  
flowering bulbs and  
deciduous shrubs.

UniBase is an excellent tool for breeders or anyone who wants to develop a germplasm inventory.

For further information, contact Dr Shahrokh Khanizadeh, UniBase developer

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or visit  
[www.universaldbase.com](http://www.universaldbase.com)

## Irrigation system operates on 'need to drink' basis

The old proverb 'waste not, want not' is becoming hard currency where water is in short supply. The Okanagan Valley in British Columbia's interior is just such a place, and scientists at the Pacific Agri-Food Research Centre (PARC) in Summerland are working on a system to deliver water when orchards need it.

More than this, say researchers, it will provide only as much water as is needed. This not only conserves water resources, but it reduces the risk of nitrate leaching, a chronic concern where the area's coarse-textured soils are concerned.

The key to minimizing water use is to have a clear understanding of how much moisture is

used by the plant, how much is transpired through its leaves, and how much is lost through the soil.

Scientists have been compiling data that allow them to estimate crop water use. Various monitoring equipment technologies provide the information. For instance, a porous ceramic plate attached to a length of pipe measures evaporation, and a lysimeter, essentially a large, buried pot, shows water balance.

Now, factor in weather data and tree leaf



canopy size, and you should be able to tell just how much water is needed. But here's the really cool part: just feed the data into an electronically controlled irrigation system.

Researchers have been doing just that with a drip irrigation system. They've scaled up the technology to the farm level, and the results are very promising. They figure it would cost about \$5 thousand to install in a typical operation.

The study received funding from the Matching Investment Initiative. 



Time for a drink? They'll let you know

For further information, contact Mr. Paul Milburn, Acting Science Director, Water Quality and Quantity

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## Scientists use weather to predict soil moisture



for both spring wheat and pasture lands.

Meteorological data provide drought indices based on rainfall. But it's the timing of the rainfall that's critical. When the days are long and it's really hot out there, rainfall isn't going to have the same impact that it has during cool spring weather when the

Looking to the skies can tell you about the drought beneath your feet, provided you have a computer interface between zenith and nadir. Scientists at the Lethbridge Research Centre in Alberta are using computer modelling to determine the aridity of the soil.

Soil moisture modelling is used to get up-to-date data on a given area. And once you know the current readings, you can predict what the levels will be under different weather circumstances. Researchers have modified a modelling program so that they can predict the moisture,

soil still holds meltwater moisture from the snow.

The Lethbridge modelling system provides soil moisture content at different soil layers to provide an accurate picture of what's really in there. It also gives a running account of the soil moisture-water stress threshold, which indicates how much water is needed.

The information generated by the system

can be used as a management tool to decide, for instance, when to seed. The province of Alberta is using it for crop insurance purposes, and it can be used to determine the persistence of intense drought. 

For further information, contact Dr. Gilles Roussel, Science Director, Air Quality

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**The sky is an open book**

when plugged into a computer

## It's on the level: terraced potatoes save water, reduce erosion

Controlling variability is thinking behind a terracing experiment carried out by the Potato Research Centre in Fredericton. The idea is to reduce erosion and runoff while making moisture more available to the crop.

Some of the most serious water erosion in Canada is associated with potato production in the rolling topography

of the upper Saint John River Valley in northwestern New Brunswick. And once the water races off to seek its own level, dragging some of the topsoil down with it, the potatoes are left high and dry.

Researchers fought back by terracing the fields and creating grassed waterways. They found that contour planting of

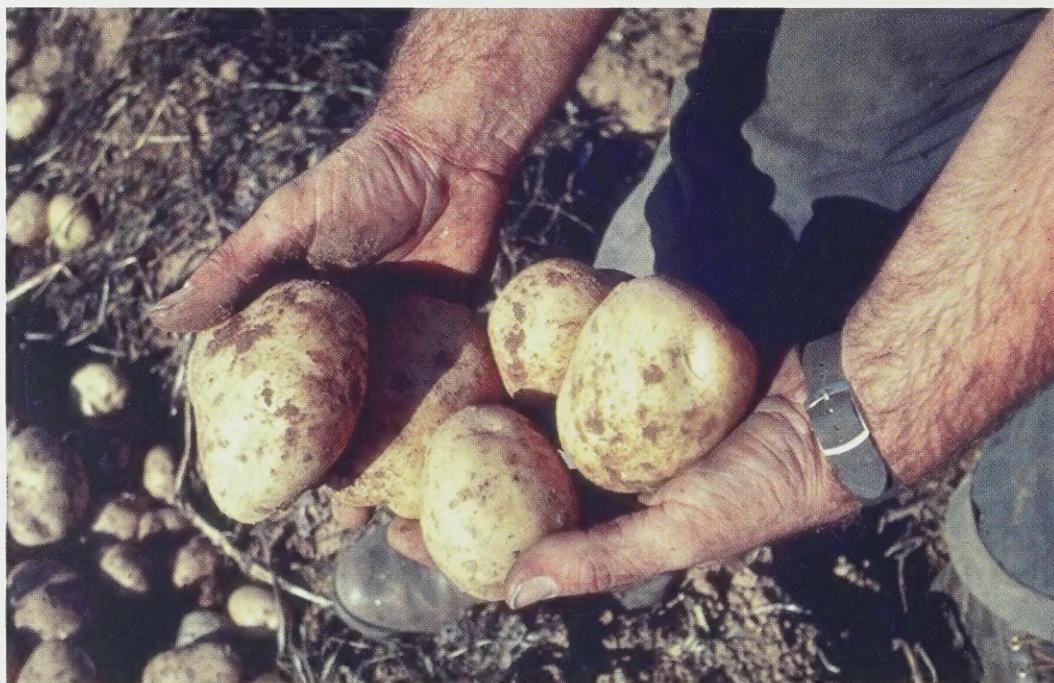


Not this With terracing

potatoes associated with terracing reduced runoff and flooding of ditches and streams, and

increased soil moisture retention.

The evaluation showed that, under potatoes, these structures reduced runoff by as much as 150 mm of rainfall equivalent, thereby increasing available moisture for potato growth, and reduced soil losses from 20 t/ha per year to 1 t/ha per year. 



The net results Good spuds from good management

For further information, contact Mr. Paul Milburn, Acting Science Director, Water Quality and Quantity

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## Fertilizer helps even under dry conditions

Producers tempted to cut back on fertilizer during dry years may want to reconsider, according to scientists at the Semiarid Prairie Agricultural Research Centre in Swift Current. They've compiled data from long-term fertilizer trials in southwestern Saskatchewan suggesting that even in dry years nitrogen applications are more

likely to provide an economic benefit.

The common wisdom is that dry soils in springtime can mean big-time crop losses, so why waste money on fertilizer? But spring soil moisture is not an indicator of growing season rainfall, as the study showed.

In fact, failure to apply adequate nitrogen

fertilizer to wheat even in dry springs could prevent the crop from taking advantage of any subsequent moisture received later in the growing season. The study showed that not applying nitrogen during dry springs resulted in a yield loss of over eight bushels per acre in six years out of ten.

Moreover, wheat typically responds to nitrogen fertilizer even in dry years. And crops need enough nutrients early in the growing

season to develop a root system that can plumb the soil for moisture.

But the most important thing is to test for residual soil nitrogen in the spring. That way, say researchers, growers can determine the best application strategy for their crop. //

For further information, contact Dr. John Richards, Science Director, Nutrients and Organic Residues

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E-mail: richardsj@agr.gc.ca



**Bring on the nitrogen** Dry spring soils are no reason not to

## New information system helps manage land and water resources

Farmers, planners and municipalities in Eastern Ontario can now 'point and click' their way to information on soils, land and water resources as part of a new online Regional Environmental Information System (REIS).

REIS was developed by researchers at the Eastern Cereal and Oilseed Research Centre in Ottawa, in partnership with several municipalities and Autodesk Canada Inc. REIS provides a regional information

Current applications of REIS address issues of water resource management, regional nutrient management and agricultural land evaluation. Already launched in Eastern Ontario (<http://reis.agr.ca>), the National Land and

Water Information Service is expected to gradually apply the REIS concept across the country. 

For further information,  
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Assessment, Use and Health

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AGvance

AGvance is Agriculture and Agri-Food Canada's science newsletter for the agri-food industry. Its goal is to promote research partnerships and technology transfer to businesses and other organizations interested in research and development.

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Utilité des engrapis, même par temps sec

## Les résultats nets Des pommes de terre saimes, la clé d'une bonne gestion



Voir ci-dessous coordonnées :

des ressources en eau.  
Milburn, directeur de  
programme scientifique par  
communiquer avec Paul  
renseignements, veuillez  
Pour plus amples

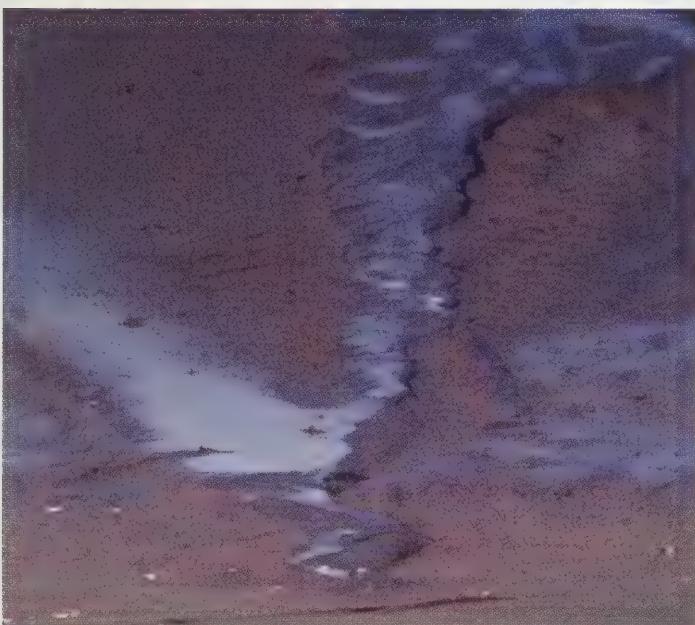


par annee. **N**  
perres de 20 t/ha à 1 t/ha  
de terre, et diminuer les  
la croissance des pommes  
d'humidité disponible pour  
augmentant ainsi le taux  
de précipitations,  
de l'équivalent de 150 mm  
réduisant le ruissellement  
terre, ces structures  
utilisées pour la pomme de  
L'étude a démontré que,  
grâce à la culture en terrasse

combinée à l'utilisation de  
terrasses, réduisait le  
ruissellement et  
terrasses dans les champs  
en construction des  
terrasses sont très  
des cours d'eau le long  
pommes de terre le long  
constate que la culture des  
l'enrobage des fosses et  
l'érosion de l'humidité  
du sol.

de la terre dans le relief  
production de la pomme  
Canada sont liés à la  
hydrigue des cas d'érosion  
Certains des cas d'érosion  
culture.  
d'humidité propice à la  
favorisant un taux  
et le ruissellement tout en  
but est de réduire l'érosion  
de terre, à l'érosion. Le  
recherches sur la pomme  
menée par le Centre de  
construction de terrasses  
d'une expérience de  
L'eau s'est écoulée,  
Haut-Saint-Jean dans le  
accidenté de la vallée du  
Brunswick. Une fois que  
entraînant avec elle une  
partie de la couche arable,  
les pommes de terre  
restent à découvert.  
Les chercheurs ont proposé  
des cultures sur la carte  
d'humidité de la

## La culture des pommes de terre en terrasse : économie d'eau et réduction de l'érosion



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Téléc. : (506) 452-3316  
Poste 4845  
Tél. : (506) 452-3260

des pommes de terre saimes, la clé d'une bonne gestion

Le ciel est un livre ouvert si branche à un ordinateur

Il est possible d'utiliser les renseignements produits par le système comme outil pour déterminer la quantité d'eau nécessaire.

Voici ses coordonnées :  
Tél. : (418) 657-7985  
Poste 202  
Téléc. : (418) 648-7231  
Courriel : rousseille@agr.gc.ca

Qualité de l'air :  
Dr. Gilles Roussette, directeur de programme scientifique, renseignements, veuillez communiquer avec le Dr. Gilles Roussette, veuillez pour de plus amples détails, le système peut servir à établir la persistance d'une sécheresse intense.

Le système de modélisation de l'eau de la fonte des neiges.

Le système de modélisation de l'eau encore l'humidité de l'eau lorsqu'il se sol retient temps frais au printemps pour empêcher la sécheresse.

Le système de modélisation de l'eau permet de connaître la teneur en humidité de diverses couches de sol et ainsi de tracer un portrait exact de l'évapotranspiration dans le sol. En outre, ce qui s'y trouve, il fournit un relevé hydrique et d'humidité du sol, ce qui permet de déterminer la quantité d'eau nécessaire.

Le système de modélisation de l'eau permet de déterminer la quantité d'eau nécessaire.

Les chercheurs ont recours à la météo pour prévoir l'humidité du sol



Pour de plus amples renseignements, veuillez communiquer avec Paul Millburn, directeur de Millburn : millburn@qc.ca  
Téléc. : (506) 452-3260  
Poste 4845  
Téléc. : (506) 452-3316  
Courriel : millburn@qc.ca

Est ce que viennent de faire les chercheurs à l'air d'une installation de goutte. Ils ont adapté la technologie à l'exploitation agricole et les résultats sont très prometteurs. Ils estiment qu'il en coûterait environ 5 000 \$ pour installer un système dans une exploitation classique. L'étude a bénéficié d'une aide financière dans le cadre du Programme de partenage des frais pour l'investissement.

A photograph of a small, young tree or shrub growing in a garden bed. The tree is supported by a single wooden stake. The surrounding area is covered in mulch and low-lying green plants. The image is taken from a low angle, looking up at the tree. The background is a bright, overexposed sky.

Un système d'arrosage qui fonctionne quand la terre a soif

terre a soi



Les cultures, les insectes, les mauvaises herbes ou que sais-je encore, grâce à Unibase. Les horiculteurs peuvent dorénavant créer leur propre base de données sur

Créer instantanément votre propre base de données à partir d'un nouveau logiciel

## Atelier pour aider le secteur agroalimentaire à accéder à la science au moyen d'Internet

لینک: [www.universaldatabase.com](http://www.universaldatabase.com)  
کوئریل: [khamzadehs@agrc.ac.ir](mailto:khamzadehs@agrc.ac.ir)  
تل: (+45) 346-7740

Tel. : (450) 346-4494  
poste 235

Voici ses coordonnées :

Pour de plus amples renseignements, veuillez communiquer avec le Dr. Shahrokh Khamzadeh, concepteur du *UniBase*.

Le CD comprend l'information de base de plusieurs cultures fruitières telles les bleuets, les pommes, les fraises et les cerises, ainsi que les cultures ornementales telles les

Umibase est un progiciel convivial qui provient en partie de la génération de 1997. Il permet aux usagers de créer une ou des bases de données en important des données amises que des images qui existent déjà. La généalogie de n'importe quelle culture horitcole peut être visualisée instantanément et il n'y a aucune limite quant au nombre d'entrees et d'images qui peuvent être utilisées.

Tel. : (613) 234-2325  
Tel. : (613) 234-2330

- Völii les coordonnées du CRAC :
- Conseil de recherches agronomiques du Canada
- Édifice 60, 2 agroréalmementale centrale Ottawa (Ontario)
- Feme expérimentale KIA 0C6

La balle aura lieu les 25 et 26 octobre à Wimille. Pour obtenir de plus amples renseignements, veuillez communiquer directement avec le CRAC ou visitez son site Internet à l'adresse suivante : [www.carc-crac.ca/french](http://www.carc-crac.ca/french).

concepteurs de pages Web.  
L'éducation, ainsi qu'aux  
des communautés et de  
technologies, aux spécialistes  
spécialistes du transfert de  
et de la recherche, aux

La telle r s adresse aux associations agricoles et aux universit es et aux g ouvernements, notamment aux g estionnaires responsables des politiques

d'un transfert en direct des connaissances scientifiques. Il permettra aussi de corriger les lacunes et d'étudier de plus près la coordination du transfert aérien qu'elle soit plus efficace.



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 Voici ses coordonnées :  
 Pour de plus amples renseignements, veuillez communiquer avec Paul Milbourn, directeur du programme scientifique pour les ressources en eau.

La terre peut donc être remise en valeur. Mais pour éviter de gaspiller toute cette eau, les chercheurs se sont servis d'eau pompe pour irriguer les plantules d'arbres formant un nouveau brise-vent.

Le succès avec vigueur et a donné de bons rendements.

CRAPSAs ont trouvé une action d'extraire l'eau souterraine peu profonde et d'abaisser les nappes phréatiques par gravité ou au moyen de pompes actives à l'énergie solaire. Par la suite, ils ont testé ce procédé en rabattant la culture de l'orge Hartington. Même si cette terre n'avait jamais été cultivée, l'orge y a été réussie.

Le succès du CRAPSAs a été obtenu grâce à l'application d'extraire l'eau pour effectuer le sol incultivable et salin. Les chercheurs du Centre de recherche sur l'agriculture et le développement des zones humides ont découvert que la culture de l'orge de Swift Current (Saskatchewan), dans les Prairies où les sols sont d'abord très humides mais présentent toute sorte d'avantages.

Il existe certains endroits aux souterraines dans les Prairies où les sols sont d'abord très humides mais présentent toute sorte d'avantages. Par la suite, ils ont testé ce procédé en rabattant la culture de l'orge Hartington. Même si cette terre n'avait jamais été cultivée, l'orge y a été réussie.



**La récupération de l'eau : ça batigne dans...**

